MSc Business Intelligence and Analytics

STUDENT HANDBOOK FOR MASTER'S PROJECT

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CHAPTER 1

INTRODUCTION

1.1 Introduction

The Project 1 (MANB2015) and Project 2 (MANB2027) are part of the academic module for ***Masters of Science (Business Intelligence and Analytics)*** organized by Advanced Informatics School (AIS), Universiti Teknologi Malaysia. Students are required to complete these courses for the eligibility of being awarded with ***Masters of Science (Business Intelligence and Analytics)***.

Details of this program as per shown below:

Course Code : MANB2015
Semester : Semester 2 of Year 1 (FT), Semester 3 of Year 2 (PT)
Course Name : Project 1
Credit Hours : 5

Course Code : MANB2027
Semester : Semester 3 of Year 2 (FT), Semester 4 of Year 2 (PT)
Course Name : Project 2
Credit Hours : 7

1.2 Course Objectives

a) To educate students in research methods and techniques, develop critical evaluation skills appropriate to their project topic, and provide project management experience.

b) To orient the students to understand the major steps of the scientific approach (research design) or decision analysis and the successful application of these steps to business intelligence and analytical problem
c) To nurture ability in demonstrating critical thinking about business/organizational problem and the application of appropriate analytical/business intelligence techniques in solving that problem
d) To provide experience in both writing a scientific paper or technical report and giving an oral seminar to peers on the process and results of the study

1.3 Expectation upon Course Completion

Upon the completion of these courses, it is expected that the student will:

a) Be gain professional knowledge and experience in business intelligence and data analytics area.
b) Be able to critically review current literature relevant to a proposed project
c) Be able to work independently and able to meet datelines
d) Be able to apply the appropriate software tools or code development to obtain reliable results from the experimental or simulation work.
e) Be able to produce a high quality master's project report detailing the project and all aspects of the work undertaken to achieve the results
f) Be able to communicate the results of the project verbally in the form of oral seminar

1.4 Graduate Attributes to be developed

Upon the completion of the courses, it is hope that the graduate will achieve as follows:

1. Ability to apply knowledge of data analytics and business intelligence fundamentals;
2. Ability to evaluate the problem and hypothesis during the process of the development of the project;
3. Ability to construct the system or solution for the project successfully and can be implemented in the related industry;
4. Ability to practice the ethical attitude while doing the project;
5. Ability to display clearly the proposed solution by adhering to the UTM Thesis Writing Guideline.
6. Ability to influence the method or solution proposed in the project

1.5 Scope of Master's Project

In general, the scope of the project should be equivalent to master's level. The topic of the research project will be agreed upon by discussion between the project supervisor and the student. Topics for the MSc BIA Master's project can be ranging in the area of:

- Data Management including data governance, data integration, master data management, data transformation, data architecture
- Data Mining for knowledge discovery
- Business Intelligence
- Machine Learning
- Data Analytics including predictive and prescriptive analytics
- Classification and/or Clustering
- Data Visualization and Interactive
- Social Network Analytics

- Sentiment Analytics
- Big Data Analytics including streaming analytics, unstructured analytics
- Text Analytics
- Natural Language Processing
- Imbalanced Data Analytics
- Data Quality and Assurance

and many more, as long as it is significance in the area of data science (analytics) and business intelligence.

1.6 Supervisor

Supervisor will be decided by the Programme Coordinator through the agreement of the lecturer involved in the MSc BIA programme. The supervisor is selected basically from UTM AIS group of lecturers with significance background related to the proposed area.

1.7 Activities

Below, are some major activities pertaining to the Master's Project:

- The programme coordinator will conduct the project briefing and during the session, the important dates and name of supervisor will be inform to the students.
- Students are required to discuss project description with the appointed supervisor within the first 2 weeks of the commencing of the Project 1. The earlier of the discussion is advised so that the students can be ready for the Master's project.
- The student is required to update regularly with their supervisor about their project and report writing.

- Student is required to present their Project 1 and Project 2 before end of semester (normally on Week 10 of the academic calendar). The presentation schedule will be announced at least two weeks before the actual date.
- The supervisor and the appointed examiners will provide a final evaluation of the student with constructive criticism, including comment on academic strength/weaknesses of the student, work habits, and ability to focus. The standard evaluation form will be prepared by UTM AIS.
- Student is required to produce **2 reports** to illustrate all the activities of the Master's project. One to be prepared at the end of Project 1 and the final report (Master Thesis Report) to be prepared at the end of Project 2.

1.8 Intellectual Property And Conflict Of Interest

If the Master's project conducted is carried out on the premises of a company outside of the university campus and without university's financial resources, all intellectual property generated during the project period belongs to the company. An agreement will be negotiated among the student, the programme coordinator, academic supervisor and the industry prior to the start of the project so as to ascertain ownership of intellectual property. The agreement depends on the particular status and scope of each project as well as previous patent ownerships.

1.9 Publication

Students are encouraged, but are not required to publish their work during the Master's project period in a peer-reviewed journal or indexed conference.

Students who are interested to publish their work can discuss it with their supervisor.

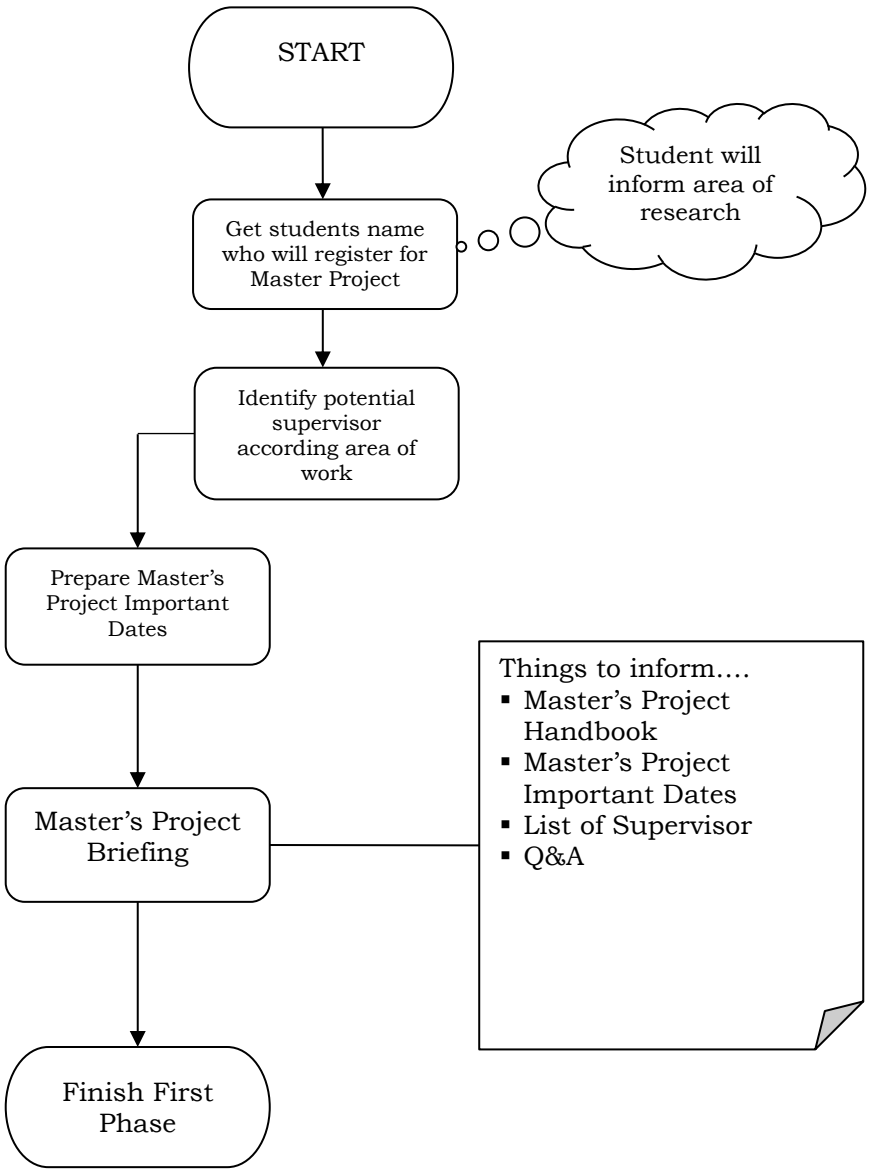
1.10 Assessment

There are three categories of evaluation exercise in this program:

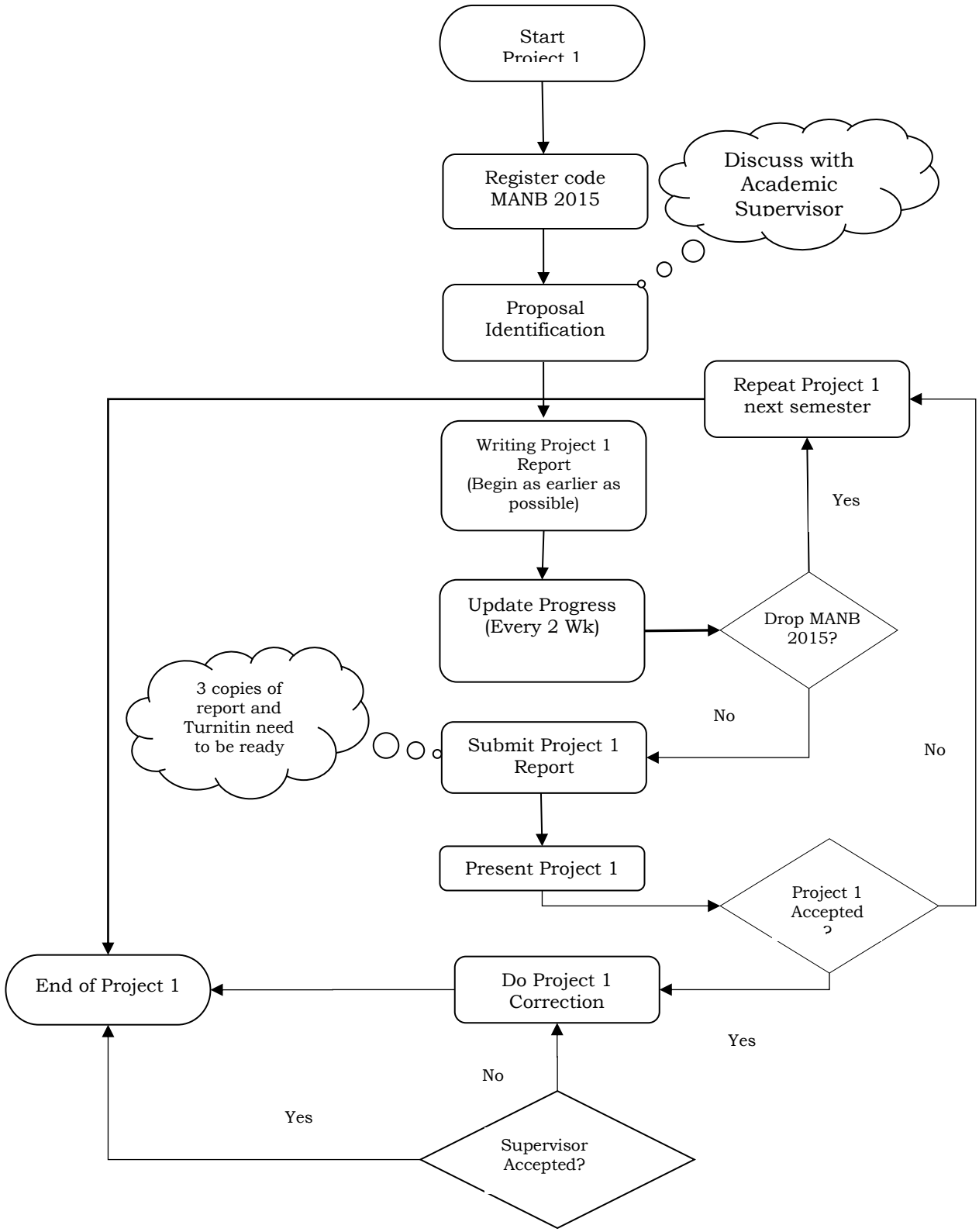
- **REPORT** evaluation by Academic **supervisor**: Project 1 (50%) and Project 2 (50%)
- **REPORT** evaluation by appointed **examiner**: Project 1 (35%) and Project 2 (40%)
- **PRESENTATION** Evaluation (Evaluate by appointed examiner and supervisor): Project 1 (15%) and Project 2 (10%)

CHAPTER 2

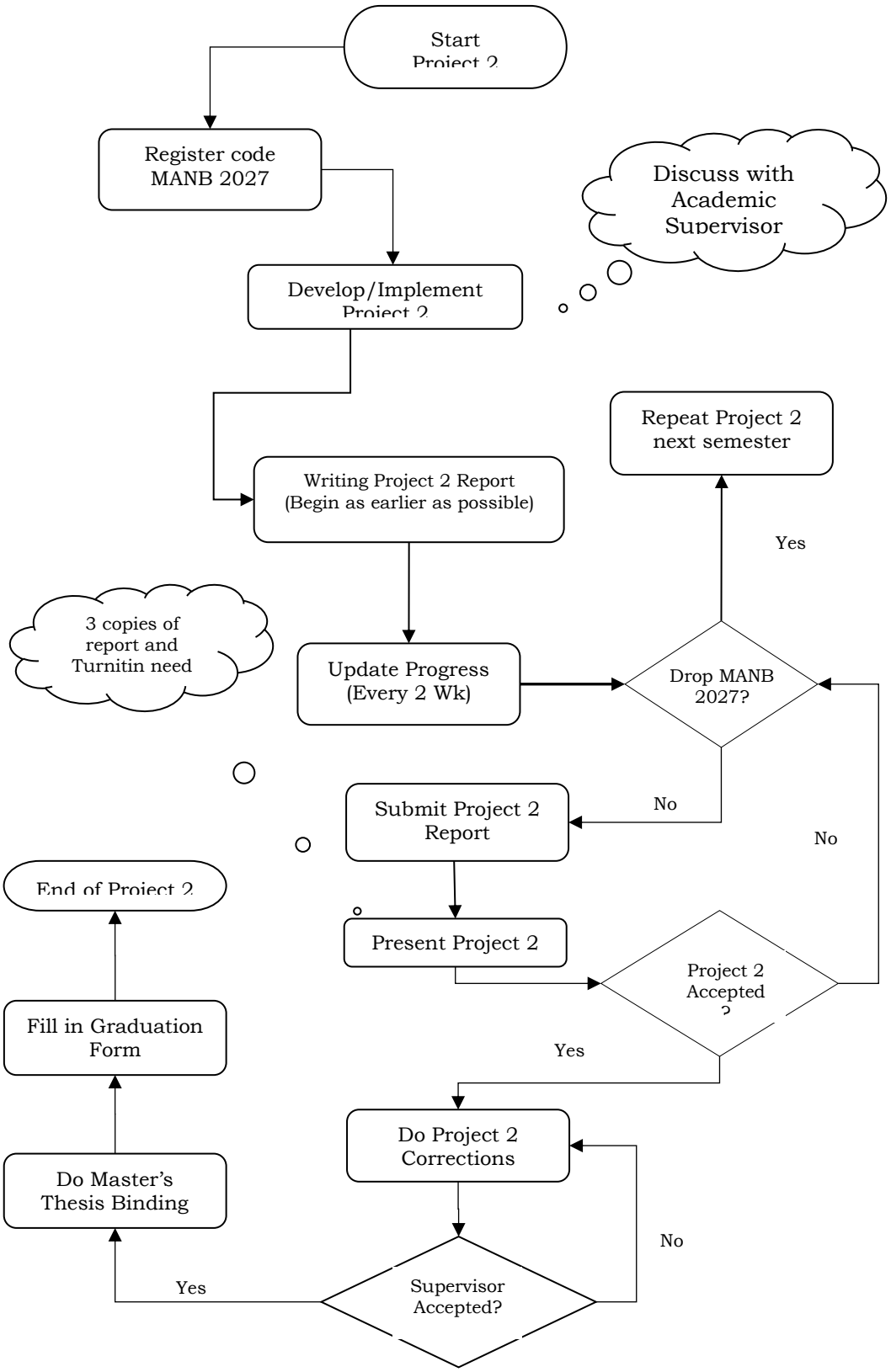
PROCESS FLOW



2.2 Project 1 Phase



2.3 Project 2 Phase



CHAPTER 3

THE GENERAL RULES

3.1 Introduction

These rules should:

a) Apply to all students who register for Project 1 (MANB 2015) and Project 2 (MANB 2027)

b) Apply to appointed academic supervisor

c) Apply to appointed examiner

3.2 The Rules

a) Involve in project that apply any significance area related with data science and business intelligence

b) Students are advised to aware of the Projects Important Dates (which is given in early phase of Project 1) and planning wisely accordingly to the date given for the project implementation.

c) Project proposal must be discussed and submitted to academic supervisor.

d) Students need to submit report for at most FIVE (5) working before the presentation date.

e) Final reports for Project 1 and Project 2 need to be submitted at most **TWO weeks** after the presentation for students who obtained **MINOR CORRECTION** and minimum **FOUR week** for students who obtained **MAJOR CORRECTION**.

f) Communicate with academic supervisor at least **THREE (3)** times meeting per semester so that the students will be on track for their project.

g) All cost during the implementation of the Master project and producing report writing is under student's load and responsibility. Students may use the facilities at UTM AIS such as computers lab during the implementation of the Masters project. If the students require certain software, the student may send a request to programme coordinator which later forward to CICT UTM.

h) During presentation day, student and the academic supervisor is **COMPULSORY** to attend. If the project is carried in the industry, the industry representative is invited to attend the presentation.

i) Students report and presentation will be evaluated by appointed examiners among UTM AIS academic staff with related expertise in the respective project. The evaluation will be using standard evaluation form provided by UTM AIS upon presentation.

j) If the student have a medical leave it should be informed immediately to programme coordinator.

k) All the confidential matters from industries need to be declared in a `Confidential Items Form'
→ *All reports and presentations must be treated with the strictest confidential and must be declared in 'Confidential Items Form'*

l) Students need to pass the Research Methodology course before register Project 1 (MANB 2015)

m) **PLAGIARISMS** of any works during Project 1 and Project 2 are strictly prohibited. Students are required to attach the result of Turnitin report with less than 20% similarity.

***These rules are subject to change.**

CHAPTER 4

MASTER'S PROJECT REPORT WRITING

4.1 Introduction

There are two reports need to be prepared for Project 1 (MANB 2015) and Project 2 (MANB 2027). For Project 2 reports it is compulsory to follow the UTM Theses formatting. The detail about these reports is as follows:

(a) Project 1 Report – MANB 2015 REPORT

– reporting about the project proposal

– To be submitted on Week 12 or Week 13 (refer to the Project Planning) of Semester 2 Year 1 for Full Time and Semester 1 Year 2 for Part Time

(b) Project 2 Report – MANB 2027 REPORT

– reporting the outcome of the project

- The outcome of the project should answer all objectives of the project.

– To be submitted on Week 12 or Week 13 (refer to the Project Planning) of Semester 1 Year 2 for Full Time and Semester 2 Year 2 for Part Time

4 . 2 Project 1 (MANB 2015) Report Guidelines

The main point from the report for Project 1 is to describe the proposal of the Master's Project. The proposed chapters as below is modifiable depend on the information of the project. The contents are:

Front page cover
Abstract
Table of contents
List of Figures (if necessary)
List of Tables (if necessary)
List of Abbreviation (if necessary)
Appendices (i.e: Gant Chart)

Chapter 1: Introduction

- Brief description about the overall chapter 1.
- Problem background of the proposed project.
- Problem statement – indicate the main problem which derives the purpose of the project
- Research Aim
- Research questions
- Research objectives
- Research scope (in point form - Concise and precise). Indicates the boundary of the project.
- Research significant – indicate the significant to conduct the work
- Expected deliverables / products at the end of the project.
- Project Plan (Gant Chart) – including the Project 1 and Project 2 activities
- Chapter Organization

Chapter 2: Literature Review

In the literature review chapter, clear and up to date citation should be provided in the content. Students are encouraged to use **Harvard author-date citation formatting**, for example (Huda *et. al*, 2017). In overall, the literature review chapter should include:

- Background study of existing system – discuss the pros and cons.
- Study on other existing systems that have the same purpose but using different approach (if any)
- Comparison study with any related system (in term of pros and cons, techniques, features, technology etc)
- Comparison study with any related existing method with indication of its strength and limitation.

The literature review chapter should have critical analysis of related works and the references should be **five (5)** from recent years. The number of references should **at least 30 references**. The total length of Literature Review chapter should be between 20 to 25% of the overall pages.

Chapter 3: Project Methodology

In this chapter, students should describe the method used to conduct the project. It should describe the procedures and processes of how the research will be conducted via the illustration of research design. Each of the phases should be explained in detail and should indicate the research objectives and the expected deliverables from the objective. The Chapter 3 section should include:

- Overview of Chapter 3
- Operational Framework

- Research Design/Activities
- Software Development Methodology (optional – if project is on software development)
- or any kind of methodology which relevant to the research/project

Chapter 4: Initial Findings

Report and discuss any initial findings or progress of Project 1 that has been done in Week 1 to Week 12 of the semester. The initial findings may including the works on data pre-processing, the initial setup of the simulation/experiment or the initial design of the system to be developed or enhanced.

Chapter 5: Conclusion

The chapter should share what you expect to get during the Project 2. The project constraints and assumption should also explain in this chapter.

4 . 3 Project 2 (MANB 2027) Report Guidelines

The report should **STRICTLY** follow the UTM Thesis format. The format is based on the "Panduan Menulis Thesis" prepared by Sekolah Pengajian Siswazah, Universiti Teknologi Malaysia. For updated version, please refer to http: www.sps.utm.my. Below are the thesis contents for Project 2 report:

Blank paper
Approval Form (Complete the form before binding your thesis)
Supervisor's approval
Project Title Page
Student's admission
Dedication
Acknowledgement
Abstract (In English and Malay)
Table of Contents
List of Tables
List of Figures
List of Acronyms
List of Appendix

The following chapters are required. You may add new chapters after discussing with your academic mentor and getting his/her approval. The sub-sections under each chapter are also subjected to necessity but it is recommended that you divide your chapters into sections and sub-sections.

Chapter 1: Project Overview

This chapter is concerned with similar concerns to the abstract and should provide an overview of the project with more detail. It sets the

scene by describing the general area that the project work addresses and also identifies the need for the specific work that the student has carried out.

1.1 Introduction

This section should provide an overview of the project and must coincide with the title chosen.

1.2 Background of the problem

This section should describe brief description of the existing problems as a justification to conduct the project.

1.3. Problem Statement

This section should describe the main problem as a justification to conduct the project.

1.4 Research Aims

This section should describe the aim of the research/work

1.5 Research Question

This section should describe the research question of the research/work

1.6 Research objectives

This chapter should describe the objective of the project that must be specific, measurable, achievable/attainable, and realistic and time factor (SMART), such as:

(a) To study …
(b) To analyze and design …
(c) To develop …
(d) To formulate … (policy/framework)
(e) To evaluate ….

It is advice to have at least **Three (3)** research objectives in the study.

1.7 Research Scopes

This should define the boundary of the project in terms of the core functionality system, data, software, hardware, platform, features or user or type of testing/evaluation and etc.

1.8 Importance of the project

This chapter should describe on potential benefits to the organization; or new contribution to the field of study

1.9 Chapter summary

This chapter should present conclusions about the investigation and outline further work. The chapter should re-outline what has been done in the investigation, and been shown in the report. The lessons learned from the overall investigation should be presented with appropriate examples.

** *Refer to Project 1 report guideline*

Chapter 2: Literature Review

This chapter is concerned with presenting a survey of background relevant to the area of investigation, leading to an evaluation of pre-existing implementations or designs and of candidate re-usable components. The selection of what to review should be guided by a clear understanding of the aims and requirements of the project. The source for the background is published material, in general, journal and conference papers, theses, research monographs, textbooks, web

sites and product information. Remember to acknowledge all work that is quoted. See the ***UTM Thesis Manual*** for further details.

2.1 Introduction

This chapter should provide an overview of a literature review framework made by student.

2.(n) Chapter

This chapter should concern with various literatures related to the topic chosen:

a. It could be an extension of a certain research/study/project; or
b. Other studies such as similar applications, techniques existing in the current market, models, similar business process, features of similar system, similar studies, system development strategies on similar projects

Ensure to quote references to reviews made according to UTM Thesis Manual. All sources used should be cited in the text; if any words are copied directly then they should be placed between quotes and the source acknowledged.

2.(n+1) Chapter

This chapter should conclude what has been done in the investigation with he/she own analytical analysis of the reviews, as part of the justification for nay method that he/she would choose later, or as a direct benefit to continue their project; or on how the review helps the project.

2.(n+..) Chapter summary

The chapter should re-outline what has been done in the investigation, and been shown in the report.

- Background study of existing system – discuss the pros and cons.
- Study on other existing systems that have the same purpose but using different approach (if any)
- Study on problem solving techniques.
- Comparison study with any related system (in term of pros and cons, techniques, features, technology etc)

The literature review chapter should have critical analysis of related works and the references should be **five (5)** from recent years. The number of references should **at least 30 references**. The total length of Literature Review chapter should in between 20% to 25% of the overall pages.

Chapter 3: Project Methodology

This chapter focuses on the research methodology used for the project, which are the project methodology or software development methodology.

3.1 Introduction

This chapter should describe brief description of the research methodology used for the project.

3.2 Project Methodology

This chapter should describe brief description of the methodology used for the development of the project. The research design should be explained in detail accordingly each phases of the project implementation

3.4 Chapter summary

The chapter should re-outline what project methodology been used, system development methodology been used and project schedule.

Chapter 4: Project Discussion

The chapter should discuss the implementation of the project including its input and output from the implementation. The discussion should be in detail on how the development/analysis/simulation is developed or conducted.

In this chapter, the result from the analysis should be explained in detail including how it is obtained, the summarization of the analysis and the evaluation of the analysis.

Chapter 5: Conclusion

This chapter should summarize the following:

- Lesson learnt from the project conducted;
- Reflection from each of the objectives derived;
- Challenges;
- Recommendation on the future work.

Appendix (documents delivered, company details and any related material, etc)

References

Other info:

- Total number of thesis pages should between **70 pages (minimum) to maximum of 250 pages** excluding appendix.
- If you have a bundle of other documents in appendix, it is suggested that you burn them into a CD, put it in a CD pocket and paste it at the hard cover at the back of your thesis.
- Get the approval from Academic Supervisor before you bind your thesis.
- Follow all the standard of writing as mentioned in `Panduan Menulis Thesis'.

Please note that, this chapter outlines the guideline for writing your report. The final content or chapter/sub-chapter headings are subject to the nature of your project and the agreement between you and your academic supervisor.

CHAPTER 6

MASTER's PROJECT EVALUATIONS

6.1 Introduction

The Master's Project (Project 1 and Project 2) evaluation is intended to measure the student's performance, work quality and accessing their generic skills development during period of project implementation.

There are two major evaluations will be made throughout the Master's Project and each consists of different components:

MANB 2015 (Project 1) Evaluation

(a) Project 1 Report :50% (Academic Supervisor) & 35% (2 Examiners)
(b) Presentation :15% (2 Examiners and Academic Supervisor)

MANB 2027 (Project 2) Evaluation

(a) Project 2 Report :50% (Academic Supervisor) & 40% (2 Examiners)
(b) Presentation :10% (2 Examiners and Academic Supervisor)

6.2 Project Presentation

There will be two oral presentations throughout the project; namely the Project 1 presentation and Project 2 presentation. The presentation is schedule on the Week 12 or Week 13 of the academic session.

The ***appointed examiners*** shall assess the oral presentation according to the following criteria:

(a) Style and presentation
(b) Precision and clarity
(c) Understanding of the project
(d) Confidence
(e) Q&A handling session
(f) Result and achievement of objectives (Project 2)
(g) Preparation

6.3 Assessment Form

The assessment form for Project 1 (MANB 2015) and Project 2 (MANB 2027) is attached as an Appendix.

LIST OF APPENDICES

APPENDIX 1: COURSE OUTLINE MANB2015

APPENDIX2: COURSE OUTLINE MANB2027

APPENDIX3: AN EXAMPLE OF PROJECT PLANNING

APPENDIX 4: MANP 2015 ASSESSMENT FORM

Appendix 4.1: Supervisor Assessment Form

Appendix 4.2: Examiner Assessment Form

APPENDIX 5: MANB 2027 ASSESSMENT FORM

Appendix 5.1: Supervisor Assessment Form

Appendix 5.2: Examiner Assessment Form